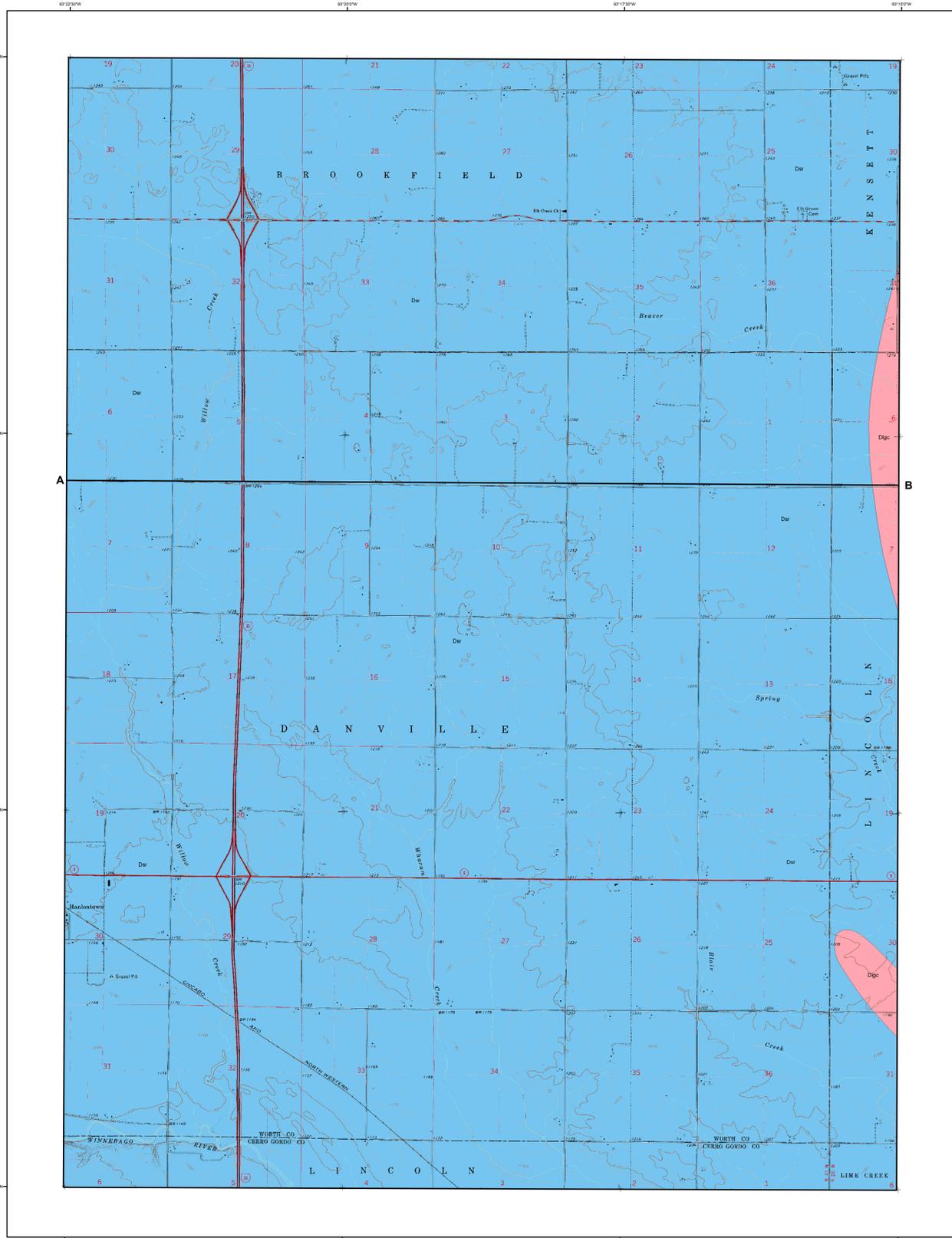
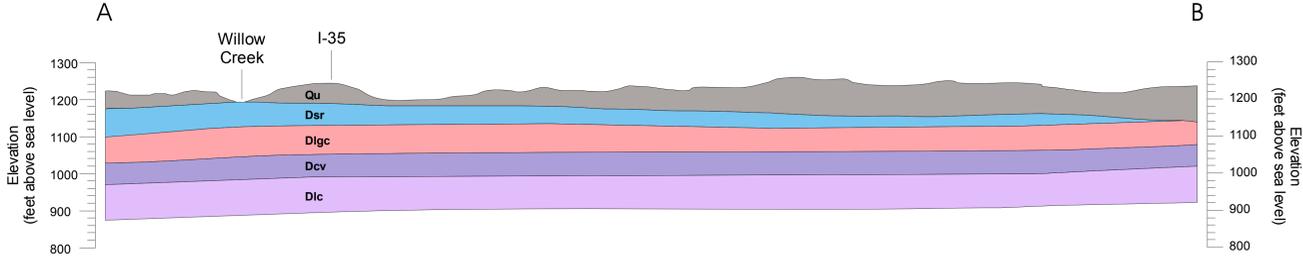


Bedrock Geology of the Fertile SE (Iowa)

7.5' Quadrangle



GEOLOGIC CROSS-SECTION A-B



INTRODUCTION

The Fertile SE 7.5' Quadrangle of Worth and Cerro Gordo counties, Iowa is located in the border area of the Des Moines Lobe landform, an area of glacial drift deposited by the Late Wisconsinian ice advance into north-central Iowa, and the Iowan Surface landform, a region characterized by various episodes of erosion before the Wisconsinian glacial events (Prior, 1991). Most of the quad is covered by Quaternary glacial and alluvial deposits, and only a few bedrock outcrops occur along the Winnebago River and Willow Creek in the southwest part of the quad.

Middle and lower Upper Devonian carbonate rocks of shallow-marine origin comprise the bedrock strata in the mapping area. The strata form the upper part of a thick Devonian carbonate succession within the northern portion of the Iowa Basin. Belanski (1927) conducted early investigations of the stratigraphy and paleontology of these limestones and dolomites. This was followed by Koch's (1970) establishment of the Shell Rock Formation, and extensive additional stratigraphic revisions by Witzke and Bunker (1984), Witzke and others (1988), Anderson and Bunker (1998), and Groves and others (2008). Stratigraphic nomenclature and correlation for this map follow the stratigraphy of Witzke and others (1988). In addition to the bedrock outcrops and nearby quarries, subsurface information for bedrock geologic mapping of this quad is derived from the analysis of water well cuttings samples. A total of about 50 wells are present within the quad, the data for which are stored in the GEOSAM database of Iowa Geological and Water Survey.

The bedrock strata in the map area are carbonates of Cedar Valley Group; they vary between limestone and dolomite with minor shale. Bedrock is subdivided into the Shell Rock and Lithograph City formations, and is dominated by the Shell Rock Formation. The Shell Rock Formation is characterized by fossiliferous and stromatoporoid-rich carbonates. The underlying Lithograph City Formation, typically composed of laminated lithographic and sublithographic limestone and dolomite, occurs only in subsurface.

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LEGEND

- CENOZOIC**
- QUATERNARY SYSTEM**
- Qu** - **Quaternary unconsolidated sediment** Consists of loamy soils developed in loess, glacial till, and colluvium of variable thickness, and alluvial clay, silt, sand and gravel. Total thickness can be more than 33 m (110 ft) in the quad. This unit is shown only on cross-section, not on map.
- PALEOZOIC**
- DEVONIAN SYSTEM**
- Dsr** - **Limestone, Dolomite, and Shale** (Shell Rock Formation) Upper Devonian. This formation is the major top bedrock unit in the quad, usually with a thickness of 12 to 18 m (40-60 ft). It is characterized by fossiliferous carbonates with some shale. Layers with abundant subspherical and tabular stromatopora, which may be replaced by calcite crystal masses, commonly occur in the lower part of the formation. Around southwest part of the quad, this formation is dominated by argillaceous dolomite and dolomitic limestone, and the thickness can be up to 30 m (100 ft).
 - Dlgc** - **Dolomite, Limestone, and Shale** (Lithograph City Formation) Middle to Upper Devonian. Maximum thickness of this map unit is up to 30 m (100 ft), consisting of dolomite and dolomitic limestone, partially characterized by interbeds of unfossiliferous to sparsely fossiliferous laminated lithographic and sublithographic limestone and dolomitic limestone, in part argillaceous or with slight shale. "Birdseye" carbonate fabric is common in some layers.
 - Dcv** - **Limestone and Dolomite** (Coralville Formation) Middle Devonian. Thickness of this formation varies between 10 and 18 m (35-60 ft), and is dominated by limestone, dolomitic limestone, and dolomite, in part laminated and argillaceous. Brachiopods and corals usually occur in the limestone facies. This unit is shown only on cross-section, not on map.
 - Dlc** - **Dolomite and Limestone** (Little Cedar Formation) Middle Devonian. Thickness of this formation ranges from 27 to 36 m (90-120 ft) in this area. It is dominated by slightly argillaceous to argillaceous dolomite and dolomitic limestone, usually vuggy and partially laminated and/or cherty. This unit is commonly fossiliferous and brachiopods are especially abundant in lower portion. This unit is shown only on cross-section, not on map.
- **Drill Holes**
 - × **Outcrops**

BEDROCK GEOLOGY OF THE FERTILE SE 7.5' QUADRANGLE, WORTH AND CERRO GORDO COUNTIES, IOWA

Iowa Geological and Water Survey
 Open File Map OFM-10-5
 September 2010

prepared by
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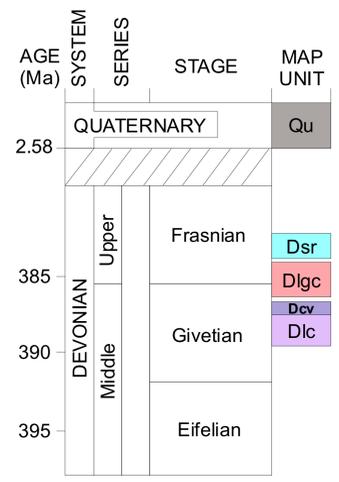
Iowa Department of Natural Resources, Patricia Boddy, Interim Director
 Iowa Geological and Water Survey, Robert D. Libra, State Geologist

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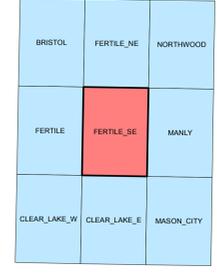
ACKNOWLEDGMENTS

New subsurface geologic data was mostly generated by the University of Iowa student Kyle Bracken who produced descriptive logs of water well drill samples. Special thanks to Sherm Lundy of BMC Aggregates, Terry Hunt and Rick Dombert of the Lehigh Cement Company, John Flores of the Holcim Cement Inc., Fred Henz of the Cerro Gordo County Conservation Board, and Mike Labahn of the Ulland Brothers Inc for allowing us access to their quarries and properties. Michael Bounk, Iowa Geological and Water Survey (IGWS), provided additional descriptive logging of water wells. Jason Vogelgesang (IGWS) prepared well samples for stratigraphic logging. Ray Anderson and Brian Witzke (IGWS) provided valuable information concerning the bedrock topography, geology and Devonian stratigraphy of the area, and Chris Kable and Andy Asell (IGWS) provided GIS mapping technical help.

Correlation of Map Units



Adjacent 7.5' Quadrangles



Location Map



Base map from USGS Fertile SE 7.5' Digital Raster Graphic (IGS GIS file DRGC28.TIF) which was scanned from the Fertile SE 7.5' Topographic Quadrangle map, published by US Geological Survey in 1972. Topographic contours and land features based on 1971 aerial photography, field checked in 1972. Land elevation contours (10' interval).

Iowa Geological Survey digital cartographic file FertileSE_BedrockGeology2010.mxd, version 10/4/10 (ArcGIS 9.2)
 Map projection and coordinate system based on Universal Transverse Mercator (UTM) Zone 15, datum NAD83.

The map and cross section are based on interpretations of the best available information at the time of mapping. Map interpretations are not a substitute for detailed site specific studies.